



“Deep Impact Comet on a Stick”



Educator Page

Created for Deep Impact, A NASA Discovery Mission
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The "Comet on a Stick" activity can be used with a wide age range. Students will see that modeling is continuous on a NASA mission as is evaluation of those models. Younger students will learn the basic characteristics of a comet. Older students will practice evaluation and improvement of the comet model shown. The importance of this activity is not the initial model or its exercise, but the fact that it will put students in the position of emulating a process that scientists and engineers follow on all missions.

The activity:

["Comet on a Stick"](#) - Activity for students

Supplies are shown within the activity. Gather household and art supplies for the students to improve or build new models.

Background materials for this activity:

[Background on the Deep Impact mission](#)

[Consider This](#) - This page shows the history of perceptions about comets.

[A Comet's Place in the Solar System](#) - A little history about where comets came from

[Ten Important Comet Facts](#) - A quick review of comet facts

[C-O-M-E-T-S - A comet acrostic](#) - Good for younger students or comet quick fact reference

[Deep Impact - Interesting Mission Facts](#) - Some fun facts about the Deep Impact mission

[Small Bodies Missions](#) - Learn more about Deep Impact and about other missions to comets and asteroids.

National Science Education Standards related to this activity:

Science as Inquiry:

- Identify questions that can be answered through scientific investigations
- Think critically and logically to make the relationships between evidence explanations
- Develop descriptions, explanations, predictions and models using evidence
- Recognize and analyze alternative explanations and predictions

Tips for materials to improve or build comet models:

- Find fruits and vegetables that might look like a comet nucleus.
- Get different “surface” coverings like chocolate cake mix or icing, chocolate shell (you’ll need to freeze the object you cover
- Paper or streamer of different kinds
- Paints or other coloring solutions
- Any kind of textured covering that you think would be useful
- Netting or other fabrics
- Bulk cushion stuffing fiber or cotton balls
- Tin foil
- See what else you can come up with

Tips for the Teacher:

1. A hairdryer only sends heat from one side while the Sun would be sending out solar wind from all sides.

2. This model does form a tail with the solar wind but it fails to show that the material that outgases from the comet mostly shoots forward. This is why we see the nucleus area of the comet glow but do not directly see the nucleus of the comet which is hidden further back inside the comet's coma.
3. The Deep Impact observing spacecraft must maintain a path beneath the comet, as the nucleus passes overhead. This helps the spacecraft to avoid coma debris from the comet tail as it passes. Coma debris is the dust, gas and rocky material that burst from the comet nucleus in jets as its surface is heated by the Sun.
4. This model does not show that the tail of a comet appears curved because in space we see a "history of the tail". At any point in time, particles move directly away from the Sun (as in this model). Over time, as the comet curves around the Sun on its orbit path, the particles leave a tail that is curved (not shown in this model).
5. As the comet moves away from the Sun, the model tail droops. In space, the particles and debris continue to be swept away from the nucleus, but the production rate of debris decreases. Note that the tail does not shoot out from the nucleus but is the trail that is left behind much like that of a jet plane.
6. Comets are not white since the rock and debris being out gassed clings to the surface of the comet in a crust that is blacker than toner for a copy machine or charcoal. Comets also appear in different irregular shapes and are not round "balls". They are shaped more like potatoes. Scientists are not sure how rough or smooth the surface of a comet might be and will get that information from the missions currently planned by NASA.
7. Comets can have three tails although scientists usually only talk about the dust and ion tail: the largest is the dust tail produced by radiation light pressure from the Sun and it carries most of the debris and gas and is easiest to see. The ion tail, produced by "solar wind" can show as a bluish glow and a neutral sodium tail produced by solar wind is very hard to see.

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